Harmonic And Intermodulation Performance Of The Semiconductor Bolometer

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SPRINGER/PLENUM PUBLISHERS, INTERNATIONAL JOURNAL OF INFRARED AND MILLIMETER WAVES; pp: 741-749; Vol: 28

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Summary

A mathematical model for the temperature dependence of the bolometer semiconductor resistance is presented. The model, basically a sine-series function, can easily yield closed-form expressions for the harmonic and intermodulation performance of the acquired interferogram voltage with large-amplitude multisinusoidal variations in the incident radiation. The special case of two-tone equal-amplitude incident radiation is considered in detail. The results show that the intermodulation components are always higher than the harmonic components of the same order. The results also show that the second-order intermodulation is always dominant and is higher than the second-harmonic component by about 6 dB. Moreover, the results show that for relatively small incident amplitudes of the incident radiation the ratio between the second- and third-harmonic components is almost equal to the ratio between the second-harmonic component and the fundamental. The results also show that the ratio between the amplitudes of the second- and third-order intermodulation components is almost equal to the ratio between the amplitudes of the second-order intermodulation component and the fundamental.

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